

What is claimed is:

1. An immunopeptide that binds to human glucose-6-phosphate isomerase with a dissociation constant of no more than about 10^7 .

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2. An isolated immunoglobulin antibody that specifically binds to human glucose-6-phosphate isomerase

3. An immunopeptide comprising at least one CDR sequence selected from the

10 group consisting of SEQ ID NO's: 15-56 or a significant homolog thereof.

4. An immunopeptide according to claim 3 having a triplet of CDR sequences.

5. An immunopeptide according to claim 4 wherein each CDR of the triplet is
15 separated from other CDR's by a spacer amino acid sequence.

6. An immunopeptide according to claim 5 wherein the spacer amino acid sequence is a framework region sequence having an amino acid sequence selected from the group consisting of SEQ ID NO's:57-108 or a significant homolog thereof.

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7. An immunopeptide according to claim 6 wherein the CDR's of the triplet are selected from either a light chain group or a heavy chain group.

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8. An immunopeptide according to claim 7 wherein the CDR's are matched according to their Fab source.

9. An immunopeptide according to claim 8 wherein the framework region sequence is matched to the Fab source of the CDR triplet.

10. An immunopolypeptide according to claim 9 wherein the amino acid sequence is a V_L or V_H fragment of the Fab source of the matched CDR triplet and framework regions.
- 5 11. An immunopolypeptide having an amino acid sequence substantially homologous to a sequence selected from the group consisting of SEQ ID NO's: 1-14.
12. An immunopolypeptide according to claim 11 which is a combination of V_L and V_H.
- 10 13. An immunopolypeptide according to claim 11 which further includes at least one constant consensus region.
14. An immunopolypeptide according to claim 13 which is a combination of a light and heavy chain fragment.
- 15 15. An immunopolypeptide according to claim 14 which is an Fab, Fab', F(ab')₂, Fd, scFv or Fv fragment.
- 20 16. An anti-GPI monoclonal antibody having CDR and framework segments with significant homology to the amino acid sequences set forth in SEQ ID NO's: 15-108.
- 25 17. A immunopolypeptide encoded in a bacteriophage that is deposited with the ATCC.
18. An immunopolypeptide Fab fragment having a light variable chain amino acid sequence selected from the group consisting of SEQ ID NO's: 1-7 and a heavy variable amino acid sequence selected from the group consisting of SEQ ID NO's: 8-14.
- 30 19. An immunopolypeptide Fab fragment having its CDR amino acid sequences of its light chain selected from the group consisting of SEQ ID NO's: 36-56 and its CDR

amino acid sequence of its heavy chain sequence selected from the group consisting of SEQ ID NO's: 15-35.

20. An anti-idiotypic antibody that specifically binds with anti-glucose-6-phosphate
5 isomerase antibody.
21. An anti-idiotypic antibody according to claim 20 which binds with a
hypervariable region segment of anti-glucose-6-phosphate antibody
- 10 22. A second immunopeptide that specifically binds with anti-6-phosphate
isomerase antibody.
23. A second immunopeptide according to claim 22 that specifically binds with a
variable region segment of anti-6-phosphate isomerase.
- 15 24. An antisense oligonucleotide that specifically hybridizes with a polynucleotide
encoding anti-glucose-6-phosphate isomerase antibody or encoding glucose-6-phosphate
isomerase.
- 20 25. An antisense oligonucleotide according to claim 24 having a non-natural
modification.
26. An antisense oligonucleotide according to claim 25 having at least one
thiophosphate group, a base alkylation group or a non-natural base group.
- 25 27. A conjugate of human glucose-6-phosphate isomerase covalently bonded to,
complexed with, or associated with, a cytotoxic agent.
- 30 28. A composition comprising immobilized human glucose-6-phosphate isomerase.
29. A nucleotide sequence encoding an immunopeptide according to claim 1.

30. A nucleotide sequence having a sequence selected from the group consisting of SEQ ID NOs: 109-122.

31. A nucleotide sequence encoding an anti-glucose-6-phosphate isomerase antibody.

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32. A nucleotide sequence encoding a humanized chimeric monoclonal antibody according to claim 20.

33. A pharmaceutical composition comprising an immunopolypeptide of claim 1 and

10 a pharmaceutically acceptable carrier.

34. A pharmaceutical composition comprising an anti-idiotypic antibody according to claim 20 and a pharmaceutically acceptable carrier.

15 35. A pharmaceutical composition comprising a second immunopolypeptide according to claim 22 and a pharmaceutically acceptable carrier.

36. A pharmaceutical composition comprising an antisense oligonucleotide according to claim 24 and a pharmaceutically acceptable carrier.

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37. A pharmaceutical composition comprising a conjugate according to claim 27 and a pharmaceutically acceptable carrier.

25 38. A method for diagnosis of autoimmune disease comprising determining the presence of an immune complex formed by combining the blood sera of a patient with human glucose-6-phosphate isomerase.

39. A method for treatment of a patient having autoimmune disease comprising administering to the patient an effective amount of an immunopolypeptide according to 30 claim 1.

40. A method for treatment of a patient having autoimmune disease comprising administering to the patient an effective amount of a humanized chimeric monoclonal antibody according to claim 20.
- 5 41. A method for treatment of a patient having autoimmune disease comprising administering to the patient an effective amount of a second immunopeptide according to claim 22.
- 10 42. A method for treatment of a patient having autoimmune disease comprising administering to the patient an effective amount of a conjugate according to claim 27.
43. A method for treatment of a patient having autoimmune disease comprising administering to the patient an effective amount of an antisense oligonucleotide according to claim 24.
- 15 44. A method for treatment of a patient having autoimmune disease comprising filtering the patient's blood extracorporeally through a filter system containing immobilized human glucose-6-phosphate isomerase.
- 20 45. A method for treatment of a patient having autoimmune disease comprising administering to the patient an effective desensitizing amount of human glucose-6-phosphate isomerase.
- 25 46. An antisense oligonucleotide according to claim 24 which hybridizes with the nucleotide sequence encoding the antibody.